Characterization of a satellite RNA associated with strain K8 of cucumber mosaic virus

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Cucumber mosaic virus strain K8 (K8-CMV), originally isolated in NW Italy from *Cucumis metuliferus*, was sent to us by Dr. Lisa after being passaged and multiplied in tobacco. Northern blots to probes against Fny-CMV (subgroup I) and Ls-CMV (subgroup II) showed K8-CMV to belong to subgroup I of CMV isolates (1). In agarose gel electrophoresis of virion encapsidated RNAs a fifth RNA was found, shown to be a satellite RNA (K8-sat RNA).

K8-sat RNA was purified from polyacrylamide gels, and its 5 'capped, 339 nucleotide (nt) long sequence (Fig. 1) was determined by both partial enzymic degradation of 3′ or 5′-end labelled RNA, and by dideoxy-chain termination on the RNA template using primers complementary to nt 166–177 and to nt 331–339. Sequence homology between K8-sat RNA and other reported CMV-sat RNAs of similar size, ranged from 85% to 94%. The biology of K8-sat RNA was characterized: it attenuated the symptoms induced in tobacco and tomato by Fny-CMV and Ls-CMV, and had no effect on the symptoms induced in squash. Also, K8-sat RNA accumulated in solanaceous hosts to much higher levels than in cucurbits. These biological properties have also been reported for other well-characterized CMV-sat RNAs, i.e., B3-, WL1-, G-, E-, Ra-, and R-sat RNAs (2, 3, 4, 5). When the sequences of these sat RNAs were compared with K8-sat RNA, the following nucleotides were found to be unique for K8: U81 (vs. G), A208 (vs. U), G215 (vs. U) C225 (vs. U). These nucleotide changes, at positions highly conserved in 25 CMV-sat RNAs (not shown), must play no role in determining the biological properties found for K8-sat RNA.

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        10         20         30         40         50         60         70         80         90        100
GUUUUGUUUG UUAGAGAAUU GCGUAGAGGG GUUAUAUCUA CGUGAGGAUC UAUCACUCGG CGGUGUGGGU UACCUCCCUU CUACGGCGGG UUGAGUUGAC
       110        120        130        140        150        160        170        180        190        200
GCAUCUCGGA CUGGGGACCG CUGGCUUGCG AGCUAUGUCC GCUACUCUCA GCACUGCGCA CUCAUUUGAG CCCCCGCUCA GUUUGCUAGC AAAACCCGGC
       210        220        230        240        250        260        270        280        290        300
CCGUGGUAUG CCGUGACCGC GGAACUUCGA AAGAAACACU CUGUUAGGUG GUAUCGUGGA UGACGCACGC AGGGAGAGGC UAAAACCUAU AAGGUCAUGC
       310        320        330
UGAUCUCCGU GAAUGUCUAC ACAUUCCUCU ACAGGACCC
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Figure 1. Complete nucleotide sequence of K8-sat RNA.

The sequence data reported will appear in EMBL, GenBank and DDBJ Nucleotide Sequence Databases under the accession number X53534.